

AMENDMENTS TO THE DRAWINGS

The attached sheet(s) of drawings include changes to Fig(s). 5D and replace the original sheet(s) including such figures.

Attachment(s): Replacement Sheet including amended Fig. 5D.

REMARKS

This paper is responsive to Non-Final Office Action dated June 5, 2006. Claims 1-66 were examined, of which claims 58-61 were allowed, claims 1-3, 10-57, and 62-66 were rejected, and claims 4-9 were objected to. Non-narrowing amendments have been made to claims 1, 2, 15, 16, 17, 29 – 31, 38 – 44, 48 – 54, 58 – 60, and 65 – 66 for clarity.

Drawings

Applicant has amended Figure 5D to correct the reference number for the “Write Op Alias Encoding” from 505 to 507 and the reference number for the “Alias Prediction Bypass Encoding” from 507 to 505.

Objections to Specification

Applicant has amended the specification to address the objections of the Office Action. A space has been inserted after “705” on pages 18 at lines 3 and 6 in paragraph 1061. Applicant has also amended the specification to correct “103” to “105” at page 6, line 1 in paragraph 1024.

Rejections under 35 U.S.C. §101

Claims 16, 28, and 38 are rejected under 35 U.S.C. §101 because the Office asserts that the claims are directed to non-statutory subject matter. The Office has deemed that these claims fall outside of statutory categories. Applicant respectfully submits that all of these independent claims fall within the statutory process category enumerated in §101. According to the Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility,

The burden is on the USPTO to set forth a prima facie case of unpatentability. Therefore if the examiner determines that it is more likely than not that the claimed subject matter falls outside all of the statutory categories, the examiner must provide an explanation.

The Examiner merely states that “tracking and predicting...are just an abstract idea.” The Examiner provides no explanation and rests his rejection on two words in the claim. For example, the Examiner ignores recitation of “in a register rename stage” as recited in claim 16.

It should be obvious to the Examiner that the method claims fall within the process category of §101. After determining that a claim falls under the process category of §101, **the Examiner should then determine whether the process is directed to nothing more than abstract ideas, such as mathematical algorithms, natural phenomena, or laws of nature.** See Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility, Section IV. If a process claim is directed to an abstract idea, then the Examiner determines whether the claim falls within a judicially created exception requiring production of a useful, tangible, and concrete result. A reasonable and correct analysis cannot deem any of the method claims as directed to any one of *mathematical algorithms, natural phenomena, or laws of nature*. **Observing or tracking repeated aliasing and then predicting aliasing based on displacement is not a mathematical algorithm, is not a natural phenomena, and is not a law of nature.** Upon determining that the method claims are process category claims that are not directed solely to mathematical algorithms, natural phenomena, or laws of nature, then the analysis is complete and the Examiner should conclude that the claims are directed to statutory subject matter falling within the process category of §101.

After a reasonable and correct analysis, the Office should determine that all of the claims are directed to statutory subject matter. Applicant respectfully requests the rejections under §101 be withdrawn, since all of the independent claims are directed to statutory subject matter.

With regard to claims 27, 37, and 47 – 53, paragraph 1063 has been amended. Claims 27, 37, 47 and 48 have also been amended accordingly.

Rejections under 35 U.S.C. §112, second paragraph

Claims 28 – 47, and 62 – 66 have been rejected under 35 U.S.C. §112, second paragraph as being indefinite. Claims 28, 38, and 62 have been amended.

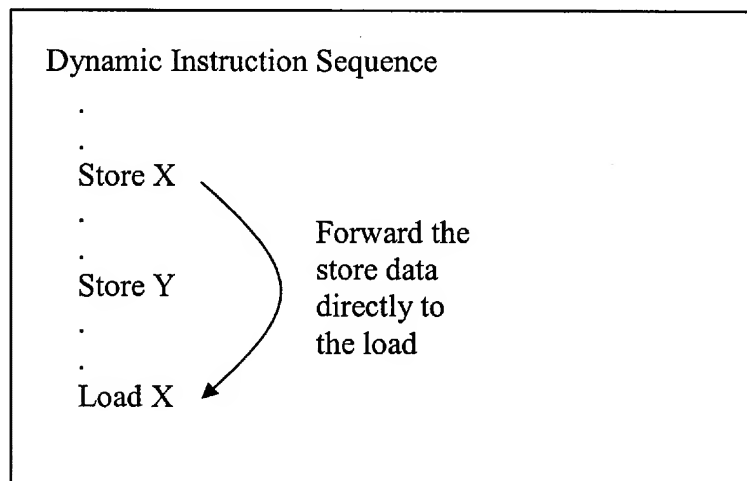
Rejections under 35 U.S.C. §102(a)

Claims 1 – 3, 10 – 47, 54 – 57, and 62 – 64 have been rejected under 35 U.S.C. §102(a) as being anticipated by Shen et al., “Modern Processor Design-Fundamentals of Superscalar Processors” (hereinafter Shen). Applicant respectfully traverses all of the rejections. Applicant respectfully notes that the majority of rejections are based on nothing more than assumptions by

the Examiner that have support from Applicant's disclosure, but absolutely no support from Shen.

Shen fails to disclose or suggest alias prediction based on displacement

To reject the independent claims 1, 16, 28, 38, 48, 54, and 62, the Examiner refers to Shen's disclosure of alias prediction at page 201 and Figure 4-43(b) of Shen. Since the Examiner repeatedly refers to this figure for many of the rejections, it is reproduced below:



The Examiner reasons, erroneously, that these two sections support the conclusion that Shen discloses an alias prediction technique that is based on displacement between instances of instructions. At page 201, Shen discloses possible use of a conventional alias predictor. *See* page 201, lines 8 – 13. Shen discloses that “[a] memory dependence predictor can be implemented to predict whether a load is likely to alias with its preceding stores.” Shen never discloses that the predictor that “can be implemented” would base predictions on execution displacement. The Examiner refers back to Figure 4-43(b), which depicts forwarding store data for a “Store X” instruction to a “Load X” instruction, and cryptically states “such as the load and store instructions exist in a loop.” **This Figure depicts load forwarding, and does not depict alias prediction based on displacement.** The corresponding text states that “if a trailing load aliases with a preceding store, i.e., there is a RAW dependence from the store to the load, load forwarding allows the load to receive its data directly from the store without having to access the data memory....” Again, disclosure of predicting aliasing based on displacement is

conspicuously absent. **Shen discloses load forwarding and discloses that a predictor “can be implemented,” but Shen never discloses or suggests predicting aliasing between a read type instruction and a write type instruction based on displacement as variously recited in the independent claims.**

Shen fails to disclose or suggest bypassing data if a threshold number of repeat aliasings is detected

Dependent claims 2 and 36 variously recite bypassing data if a threshold of repeated aliases is detected. To reject these claims, the Examiner simply refers to Figure 4-43(b). A picture of load forwarding does not disclose or suggest detecting a threshold number of repeat aliasings.

Shen fails to disclose or suggest replacing a read type instruction with a move instruction

Dependent claims 10, 25, 33, 40, and 52 variously recite substituting a register move instruction for a predicted to alias instance of a read type instruction. Once again, the Examiner simply refers to Figure 4-43(b). Depicting load forwarding does not disclose or suggest substituting a move instruction for a predicted to alias read type instruction.

Shen fails to disclose or suggest inserting a loadCheck instruction

Dependent claims 11, 41, and 53 variously recite inserting a loadCheck instruction, which when executed, verifies a predicted alias. Shen discloses at page 199 verifying a detected alias before performing load forwarding. *See* page 199, lines 4 – 7. This disclosure by Shen does not disclose or suggest inserting an instruction into a program that will verify a predicted alias.

Shen fails to disclose or suggest replacing an instance of a read type instruction with a loadCheck instruction

Dependent claims 14, 24, 31, 43, and 51 variously recite replacing a predicted to alias instance of a read type instruction with a loadCheck instruction, which when executed, verifies a predicted alias. The Examiner again refers to Shen’s disclosure of verifying a detected alias

before performing load forwarding. See page 199, lines 4 – 7. This disclosure by Shen does not disclose or suggest replacing a predicted to alias instance of a read type instruction with a loadCheck instruction that will verify a predicted alias.

Conclusion

In summary, claims 1 – 66 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that, on the date shown below, this correspondence is being

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Date

Respectfully submitted,



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